

REMARKS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1-27 are currently pending, with Claims 10-19 being withdrawn as directed to non-elected inventions. Claims 1, 10, 14, and 17 have been amended by the present amendment. The changes to the claims are supported by the originally filed specification and do not add new matter.

In the outstanding Office Action, Claims 1-3 and 20-27 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,566,787 to Tsukahara et al. (hereinafter “the ‘787 patent”); Claims 4-7 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the ‘787 patent in view of U.S. Patent No. 6,029,500 to Tom (hereinafter “the ‘500 patent”); and Claims 8 and 9 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the ‘787 patent in view of U.S. Patent No. 6,060,692 to Bartley et al. (hereinafter “the ‘692 patent”).

Applicants wish to thank the Examiner for the interview granted April 6, 2010, at which time a proposed amendment to the claims was discussed. No agreement was reached pending the Examiner’s further consideration of the claims upon formal submission of a response to the Office Action.

Amended Claim 1 is directed to a sensor head, comprising: (1) a three-dimensional base body having a curved surface allowing definition of a circular orbital band; (2) an interdigital electroacoustic transducer being connected to a switching unit disposed outside of the sensor head, and arranged on the orbital band of the three-dimensional base body, and configured to excite a surface acoustic wave to perform multiple roundtrips along the orbital band; and (3) a gas-sensitive film at least a part of which is formed on at least a part of the orbital band of the three-dimensional base body, and configured to react with a specific gas

molecule so as to develop a change in a propagation characteristic of the surface acoustic wave, wherein the switching unit is configured to switch between an external high frequency generator and an external detection/output unit so that the switching unit is configured to transfer a high frequency electric signal from the external high frequency generator to the interdigital transducer, and then the switching unit is configured to switch a signal path from the interdigital transducer to the external detection/output unit, after the interdigital transducer has transmitted the surface acoustic wave, but before the surface acoustic wave returns from a predetermined number of roundtrips, and the interdigital transducer is configured to convert the surface acoustic wave orbiting along the orbital band into a high frequency electric signal so as to detect the change in the propagation characteristic. The changes to Claim 1 are supported by the originally filed specification and do not add new matter.¹

Applicants respectfully submit that the rejection of Claim 1 as anticipated by the ‘787 patent is rendered moot by the present amendment to Claim 1.

The ‘787 patent is directed to an elastic surface-wave device that includes a substrate having a surface, wherein the surface includes a circularly continuous band on a spherical shape; a surface acoustic wave generator that is provided on the surface of the substrate at the circularly continuous band and generates surface acoustic waves on the surface. Further, the ‘787 patent discloses that the spherical shape is related to the surface acoustic wave so that the surface acoustic wave propagates within the circularly continuous band in a first direction without diffusing over the circularly continuous band in a second direction other than the first direction.

However, Applicants respectfully submit that the ‘787 patent fails to disclose a gas-sensitive film at least a part of which is formed on at least a part of the orbital band of a three-

¹ See Figure 2A and page 20, lines 13-22 in the specification.

dimensional base body, and configured to react with a specific gas molecule so as to develop a change in a propagation characteristic of the surface acoustic wave, as recited in amended Claim 1. Rather, the ‘787 patent merely discloses a piezoelectric material film 14a attached at a desired position on a surface of a non-piezoelectric material 12.² Further, as noted by the outstanding Office Action, the ‘787 patent merely discloses that “...when a fluid such as a gas or a liquid is flown in the cavity 61 through a pair of the outside communication opening 62 and 63 of the substrate 60, it is possible to facilitate a use of the elastic surface-wave device 10’ as a chemical sensor or a biosensor for that fluid.”³ However, Applicants note that the ‘787 patent fails to explicitly disclose a gas sensitive film that is configured to react with a specific gas molecule so as to develop a change in a propagation characteristic of the surface acoustic wave, and which is formed on at least a part of the orbital band, as required by Claim 1. Rather, column 10 of the ‘787 patent merely discloses a possible use of the device shown in Figure 6 of the ‘787 patent, but does not specifically disclose the gas sensitive film recited in Claim 1.

Further, Applicants respectfully submit that the ‘787 patent fails to disclose an electroacoustic transducer connected to a switching unit disposed outside of the sensor head, wherein the switching unit is configured to switch between an external high frequency generator that transfers a high frequency electric signal to the interdigital transducer, as recited in amended Claim 1. Applicants respectfully submit that the ‘787 patent is silent regarding a sensor head having an electroacoustic transducer connected to a switching unit, as recited in amended Claim 1.

For the reasons stated above, Applicants respectfully submit that the rejection of Claim 1 is rendered moot and that Claim 1 patentably defines over the ‘787 patent.

² See ‘787 patent, column 5, lines 21-27.

³ See the ‘787 patent, column 10, lines 54-58.

Regarding the rejection of dependent Claims 4-9 under 35 U.S.C. § 103(a),

Applicants respectfully submit that the ‘500 and ‘692 patents fail to remedy the deficiencies of the ‘787 patent, as discussed above. Accordingly, Applicants respectfully submit that the rejections of dependent Claims 4-9 are rendered moot by the present amendment to Claim 1.

Claim 27 is directed to a sensor head, comprising: (1) a three-dimensional base body having a curved surface allowing definition of a circular orbital band; (2) a first electroacoustic transducer arranged on the orbital band of the three-dimensional base body, and configured to excite a surface acoustic wave to perform multiple roundtrips along the orbital band; (3) a gas-sensitive film at least a part of which is formed on at least a part of the orbital band of the three-dimensional base body, and configured to react with a specific gas molecule so as to develop a change in the propagation characteristic of the surface acoustic wave; and (4) a second interdigital transducer arranged on the orbital band of the three-dimensional base body separated from the first electroacoustic transducer, and configured to convert the surface acoustic wave orbiting along the orbital band into a high frequency electric signal so as to detect the change in the propagation characteristic.

Applicants respectfully traverse the rejection of Claim 27 as anticipated by the ‘787 patent.

As discussed above, the ‘787 patent is directed to an elastic surface-wave device that includes a substrate having a surface, wherein the surface includes a circularly continuous band on a spherical shape; a surface acoustic wave generator that is provided on the surface of the substrate at the circularly continuous band and generates surface acoustic waves on the surface. In particular, as shown in Figure 1, the ‘787 patent discloses an oscillator 14b that has a comb-like electrode 14c connected to a high frequency power supply 16.

However, Applicants respectfully submit that the ‘787 patent fails to disclose a second interdigital transducer arranged on the orbital band of the three-dimensional base

body separated from the first electroacoustic transducer, and configured to convert the surface acoustic wave orbiting along the orbital band into a high frequency electric signal so as to detect the change in the propagation characteristic, as recited in Claim 27. Rather, as disclosed on page 4 of the Office Action, the Office Action appears to interpret the oscillator 14b as the second transducer and the electrode 14c as the claimed first electroacoustic transducer. However, Applicants respectfully submit that such an interpretation is incorrect. As discussed above, the '787 patent discloses that both poles of the high frequency power supply 16 are connected to the first comb-like electrode 14c and the second comb-like electrode 14b in opposite directions orthogonal to the maximum circumferential line 12a from the outside of the circular region 12b. Further, Applicants note that column 9, lines 40-47 in the '787 patent disclose that when a plurality of the elastic surface-wave generators 14 are provided on the surface of a same spherical substrate 14, the plurality of the elastic surface-wave generators 14 must be arranged on the surface of the same spherical substrate 14 in such a manner that the propagation paths of the surface acoustic waves generated by the surface acoustic wave generators 14 do not overlap each other. On the contrary, Claim 27 requires a second interdigital transducer arranged on the (same) orbital band of the three-dimensional base body separated from the first electroacoustic transducer, and configured to convert the surface acoustic wave orbiting along the same orbital band into a high frequency electric signal so as to detect the change in the propagation characteristic.

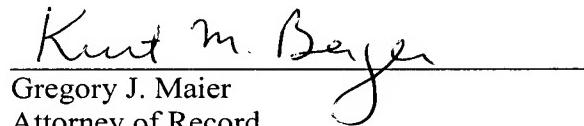
For the reasons stated above, Applicants respectfully traverse the rejection of Claim 27 as anticipated by the '787 patent.

Thus, it is respectfully submitted that independent Claims 1 and 27 (and all associated dependent claims) patentably define over any proper combination of the Yamanaka et al. reference, the '787 patent, the '500 patent, and the '629 patent.

Consequently, in view of the present amendment and in light of the above discussion, the outstanding grounds for rejection are believed to have been overcome. The application as amended herewith is believed to be in condition for formal allowance. An early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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